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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,057	05/26/2006	Sandrine Dulac	007035.00013	1254

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EXAMINER	
PATEL, DEVANG R	

ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/596,057	DULAC ET AL.	
	Examiner	Art Unit	
	DEVANG R. PATEL	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18 and 20-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18,20-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Interpretation

With respect to claims 1 and 20, the limitation "having no intentional addition of sodium" is interpreted to mean that no amount of sodium is intentionally added in any form to the aluminum brazing alloy besides the presence of naturally-occurring unavoidable impurities.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. **Claim 20** is rejected under 35 U.S.C. 103(a) as being obvious over Singleton (US 3898053).

   a. **Regarding claim 20**, Singleton discloses a brazing sheet capable of fluxless brazing of aluminum materials under a controlled atmosphere consisting essentially of nitrogen/argon at a temperature of between 580°C and 620°C abstract; example 1). Examiner also points out that "suitable for fluxless brazing…" is an intended use of the brazing sheet and does not further limit the product claim. The brazing sheet of Singleton consists essentially of an aluminum core alloy and a cladding layer on at least one face of the core alloy. The core alloy has a composition up to about (by weight): Si= 0.8%; Fe= 0.4%; Cu= 0.4%; Mn= 1.5%; Mg= 3%; Zn= 0.4%; Ti= 0.1%; Zr<0.3; Cr<0.3; Ni<2.0; Co<2.0; Bi<0.5; Y<0.5 (i.e. 0), and remainder aluminum (col. 1, lines 50-65).

Thus, the composition of the core alloy of Singleton lies inside or overlaps within the claimed ranges for all of the elements. With respect to the cladding layer on the face of the core alloy, it includes 7-14 wt% Si and 0.02-0.2 wt% Bi, and occupies an entire thickness between the core alloy and respective outer surface of the brazing sheet (col. 6, lines 35-40). In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists (MPEP 2144.05). Singleton does not add any sodium to the cladding layer and therefore, the cladding layer meets having "no intentional addition of sodium". However, Examiner points out that such limitation does NOT further limit the product claim because one would have no way of distinguishing between intentionally added and naturally occurring sodium in the final brazing sheet product. With respect to "aluminum brazing alloy coating", Examiner notes that it is a product-by-process limitation in a product claim and thus, the claim does not require an active coating step.

2. **Claims 1-5, 8-11, 14, 17-18, and 21** are rejected under 35 U.S.C. 103(a) as being obvious over Singleton (US 3898053) in view of Dockus (US 2003/0155409).

b. **Regarding claim 1, Singleton** discloses a process for assembly of aluminum alloy plates in which at least one of the plates consists essentially of a core aluminum alloy and a single aluminum brazing filler clad onto the core alloy (abstract; example 1). The aluminum core alloy has composition of up to about (by weight): Si= 0.8%; Fe= 0.4%; Cu= 0.4%; Mn= 1.5%; Mg= 3%; Zn= 0.4%; Ti= 0.1%; Zr<0.3; Cr<0.3; Ni<2.0; Co<2.0; Bi<0.5; Y<0.5 (i.e. 0), and remainder

aluminum (col. 1, lines 50-65). Thus, the composition of the core alloy of Singleton lies inside or overlaps within the claimed ranges for all of the elements. With respect to the brazing cladding layer on the face of the core alloy, it includes 7-14 wt% Si and 0.02-0.2 wt% Bi (col. 6, lines 35-40). Singleton does NOT add any sodium, therefore, the cladding layer meets having "no intentional addition of sodium". In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists (MPEP 2144.05).

c. Singleton discloses vacuum brazing, but does not teach fluxless brazing under controlled atmosphere at a temperature of between 580°C and 620°C, and rapid cooling. However, **Dockus** (drawn to fluxless brazing) discloses a similar process of assembly of brazed product including a core aluminum alloy having a clad layer, carried out in a fluxless, inert atmosphere at temperature of less than 600°C (¶ 24-25, 66; nitrogen- ¶ 226). Dockus also discloses that the cooling rate may be adjusted as necessary in accordance with furnace design and process particulars (¶ 228). Dockus discloses that prior art brazing processes using flux are susceptible to flaking and contamination and the flux is difficult to apply in many areas, leading to corrosion (¶ 5). Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to perform brazing process of Singleton in a fluxless, inert atmosphere similar to Dockus in order to avoid difficulties caused by the use of flux such as flaking, contamination & cleanliness and prevent corrosion (Dockus).

d. Singleton does not specifically mention coating the cladding layer on the core alloy, however, it is noted that "brazing alloy coated" does not require an active coating step. Nevertheless, such technique is well-known in the art. **Dockus** teaches applying a cladding layer on the aluminum core alloy (just like Singleton) using a variety of processes including rolling or spray coating (¶ 96-97; layer 2 in fig. 2). In view of that, it would have been obvious to a person of ordinary skill in the art at the time of the invention to coat the clad layer on the core alloy in the method of Singleton since such is an art-recognized alternative of applying a clad layer.

e. As to claims 2-5 and 8, Singleton discloses that copper content of the core alloy is up to about 0.4%; manganese content of the core alloy is up to about 1.5%; magnesium content of the core alloy is 0.1-3%; and silicon content being up to 0.5% (col. 6, lines 45-60). In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists (MPEP 2144.05).

f. As to claim 9, Dockus discloses that brazing layer can be cladded onto the core alloy by roll bonding (¶ 97). In view of that, it would have been obvious to a person of ordinary skill in the art at the time of the invention to apply the clad layer on the core alloy by co-rolling in the method of Singleton since such is an art-recognized alternative.

g. As to claim 10, in accordance with broadest reasonable interpretation, the brazing clad layer of Singleton is intrinsically composed of particles.

h. As to claim 11, it is noted that "process used for manufacturing of heat exchangers" recites an intended use and does not further limit the process of making an aluminum alloy plate assembly. Nonetheless, Dockus teaches using the process of the brazed assembly in manufacturing heat exchangers (¶ 242) and aging is reasonably expected to occur in hot parts during operation of the exchanger.

i. **Regarding claim 14, Singleton** discloses a process for brazing of aluminum alloy plates in which at least one face of the core alloy plate has a single layer consisting of cladding alloy including 7-14 wt% Si and about 0.02-0.2 wt% Bi (col. 6, lines 35-34; example 1). The aluminum core alloy has composition up to about (by weight): Si= 0.8%; Fe= 0.4%; Cu= 0.4%; Mn= 1.5%; Mg= 3%; Zn= 0.4%; Ti= 0.1%; Zr<0.3; Cr<0.3; Ni<2.0; Co<2.0; Bi<0.5; Y<0.5 (i.e. 0), and remainder aluminum (col. 1, lines 50-65). Thus, the composition of the core alloy of Singleton lies inside or overlaps within the claimed ranges for all of the elements. With respect to the brazing cladding layer on the face of the core alloy, it includes 7-14 wt% Si and 0.02-0.2 wt% Bi (col. 6, lines 35-40). The cladding layer does not have any intentional addition of sodium. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists (MPEP 2144.05).

j. Singleton does not specifically mention coating the cladding layer on the core alloy. However, such technique is well-known in the art. **Dockus** teaches applying a cladding layer on the aluminum core alloy (just like Singleton) using a

variety of processes including rolling or spray coating (¶ 96-97; layer 2 in fig. 2). In view of that, it would have been obvious to a person of ordinary skill in the art at the time of the invention to coat the clad layer on the core alloy in the method of Singleton since such is an art-recognized alternative of applying a clad layer.

k. Singleton discloses vacuum brazing, but does not teach fluxless brazing under controlled atmosphere at a temperature of between 580°C and 620°C, and rapid cooling. However, **Dockus** (drawn to fluxless brazing) discloses a similar process of assembly of brazed product including a core aluminum alloy having a clad layer, carried out in a fluxless, inert atmosphere at temperature of less than 600°C (¶ 24-25, 66; nitrogen- ¶ 226). Dockus also discloses that the cooling rate may be adjusted as necessary in accordance with furnace design and process particulars (¶ 228). Dockus discloses that prior art brazing processes using flux are susceptible to flaking and contamination and the flux is difficult to apply in many areas, leading to corrosion (¶ 5). Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to perform brazing process of Singleton in a fluxless, inert atmosphere similar to Dockus in order to avoid difficulties caused by the use of flux such as flaking, contamination & cleanliness and prevent corrosion (Dockus).

l. As to claims 17-18, Singleton discloses that copper content of the core alloy is up to about 0.4%; manganese content of the core alloy is up to about 1.5%; magnesium content of the core alloy is 0.2-0.8%; and silicon content being up to 0.5% (col. 6, lines 45-60). In the case where the claimed ranges "overlap or

lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists (MPEP 2144.05).

m. As to claim 21, Singleton discloses that one or both faces of the core alloy may have a cladding layer (col. 1, line 53).

3. **Claims 12, 15 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Singleton in view of Dockus as applied to claims 1 and 14 above, and further in view of Miller (US 5863669, of record).

n. As to claims 12 and 15, Singleton or Dockus fails to disclose aging at the claimed temperature. However, **Miller** discloses aging at an elevated temperature in the range of 100°C - 250°C after rapid cooling, which results in high post-brazing strength properties (col. 5, lines 26-58). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate aging steps similar to Miller in the process of Singleton in order to obtain high post-brazing strength properties (Miller).

o. As to claim 22, Singleton as modified by Dockus discloses coating one face of the core alloy with the brazing alloy but fails to disclose an opposed face coated with an Al-Zn alloy. However, Miller discloses that it is known in prior art to provide Al-Si brazing layer on one side of the core, and a sacrificial anode layer of Al-Zn alloy on the other side for the purpose of reducing corrosion (col. 2, lines 4-7). Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to coat the opposed face of the core alloy with a

sacrificial Al-Zn alloy in the process of Singleton in order to impart corrosion resistance to the assembly.

4. **Claims 6-7 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Singleton in view of Dockus as applied to claims 1 and 14 above, respectively, and further in view of Bye et al. (US 4929511, "Bye", of record).

p. As to claims 6-7 and 16, Singleton does not disclose claimed bismuth or yttrium content in the core alloy. **Bye** is drawn to a method of making aluminum based brazing foils in fluxless brazing processes (col. 2, lines 30-33). Bye discloses that the alloy composition includes 0-0.2 wt% of at least one element selected from the group including bismuth, strontium, lithium, yttrium, calcium, and 0-2 wt% of at least one rare earth metals (col. 2, lines 33-42). Thus, 0.1 wt% of bismuth and 0.1 wt% of yttrium overlaps with claimed ranges. Bye teaches that such alloying elements influence the filler metal flow, refine the microstructure of the brazed joint, thereby improving the mechanical properties of the joint. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate claimed amounts of bismuth and yttrium in the core alloy of Singleton because doing so would influence the filler metal flow, refine the microstructure of the brazed joint, thereby improving the mechanical properties of the joint (Bye- col. 2, lines 45-50).

5. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Singleton in view of Dockus as applied to claim 10 above, and further in view of Teshima et al. (US 6234377, "Teshima", of record).

q. As to claim 13, Singleton or Dockus does not disclose the brazing alloy coating containing a polymer resin. However, **Teshima** (drawn to brazing composition and method of brazing Al material) discloses coating brazing alloy particles by a suitable polymer resin (col. 6, line 65- col.7, line 19). Teshima discloses that the addition of such a resin improves properties such as the uniformity of the surface and adhesion of the coating. Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the polymer resin of Teshima in brazing alloy coating of Singleton and Dockus in order to improve properties such as the uniformity of the coated surface and adhesion of the coating (Teshima- col. 3 line 63-col.4, line 4).

Response to Amendment and Arguments

Applicant's arguments with respect to claims 1-18 and 20-22 have been fully considered but are moot in view of the new ground(s) of rejection set forth above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the art would have reasonably understood from the texts. Only specific portions of the texts have been pointed out to emphasize certain aspects of the prior art, however, each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

Applicant is reminded to specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. 1.121; 37 C.F.R. Part 41.37; and MPEP 714.02.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVANG PATEL whose telephone number is (571)270-3636. The examiner can normally be reached on Monday thru Thursday, 8:00 am to 5:30 pm, EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devang Patel/
Examiner, Art Unit 1793

/Jessica L. Ward/
Supervisory Patent Examiner, Art Unit 1793